

## A New Variety of *Cyperus pacificus* (Ohwi) Ohwi (Cyperaceae)

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*Cyperus pacificus* (Ohwi) Ohwi var. *margoinflatus* S. Fujii, a new variety of *C. pacificus* (Cyperaceae) is described. It closely resembles *C. pacificus* var. *pacificus* in the oblong-ellipsoid achenes with winged margins, but the margins are well inflated with spongy parenchyma. It usually occurs in the dried bottoms of irrigation ponds, and often intermixed with other species of Cyperaceae such as *C. extremiorientalis* Ohwi, *C. nipponicus* Franch. et Sav. var. *nipponicus* and var. *spiralis* Ohwi, *Fimbristylis dipsacea* (Rottb.) C.B. Clarke, and *F. squarrosa* Vahl var. *esquarrosa* Makino. A key to the new variety and closely related taxa is also provided.

Key words: achene, *Cyperus pacificus* var. *margoinflatus*, inflated margin, irrigation pond, Japan, Korea, new variety

### ***Cyperus pacificus* (Ohwi) Ohwi var. *margoinflatus* S. Fujii, var. nov.**—Figs. 1 & 2.

Similar to *Cyperus pacificus* var. *pacificus* in having oblong-ellipsoid achenes, but the margins of achenes of var. *margoinflatus* are distinctly inflated.

*Typus.* JAPAN: Osaka Pref.: Izumi, Shinoda-yama, 15 Nov. 1996, *S. Fujii* 5587 (holo-OSA; iso-KYO, MAK, TNS)

Herbs, annual. Roots fibrous. Culms tufted, yellowish green, 1–7(–17) cm tall, triquetrous, glabrous. Leaves basal, glabrous, as long as or shorter than culms; sheath reddish brown, submembranous, to 40 mm long; leaf blade yellowish green, ligulate, 10–30(–50) mm long, ca. 1–1.5 mm wide, flat, subulate. Involucral bracts 2–4, usually 3, leaf-like, yellowish green, glabrous, longer than inflorescence, ascending to horizontally spreading, wider at base, 10–50(–90) mm long, 1–2 mm wide at base. Inflorescences terminal, capitate, globose, 3–10 mm in diameter, with numerous spikelets. Spikelets densely arranged, oblong to narrowly ovoid, compressed, 2–7 mm long, ca. 1.5 mm wide, 5–17 flowered. Glumes

yellowish white on both surface, distichous, imbricate, sometimes obscurely spirally arranged at base, oblong, ca. 1.5 mm long, midvein green, apex acute. Styles elongate, stigmas 2, as long as the style. Achenes yellowish brown or brown, oblong-ellipsoid, ca. 1 mm, lenticular or sometimes trigonous, margins white, inflated, with well-developed spongy parenchyma.

*Japanese name.* Ukimi-gayatsuri

*Distribution.* Korea, Seoul; Japan, Honshu (Tohoku, Kanto, Tokai, Kinki Chugoku regions) and Shikoku.

*Habitat.* Lowland wet places with sand or sandy mud. Frequent in dried bottoms of irrigation ponds, less commonly on pond margins. Customary management of dry irrigation ponds in autumn appear to provide suitable habitat for var. *margoinflatus*. Often mixed with several small species of Cyperaceae such as *Cyperus extremiorientalis*, *C. nipponicus* var. *nipponicus*, *C. nipponicus* var. *spiralis*, *Fimbristylis dipsacea* (Rottb.) C.B. Clarke, and *F. squarrosa* Vahl var. *esquarrosa* Makino.



FIG. 1. *Cyperus pacificus* var. *margoinflatus* (S. Fujii 14960) growing in dried bottoms of irrigation ponds (Osaka Pref., Shinoda-yama, Ono Pond, Nov. 21, 2010)

*Specimens examined.* Korea. Seoul, Sept. 1901, *U. Faurie* 976 (cited as *C. pacificus* in Ohwi (1944), KYO). Japan. Miyagi Pref.: Nagaoka, Furukawa, 19 Sept. 1988, *T. Noguchi et al. s.n.* (KYO). Ibaraki Pref.: Tsukuba-cho, 11 Sept. 1979, *T. Noguchi & A. Huruhashi s.n.* (KYO). Shizuoka Pref.: Kakegawa, 1 Oct. 1966, *T. Sugino* 2 (TNS). Osaka Pref.: Shinoda-yama Hills, Izumi, 22 Sept. 1960, *K. Seto* 10418 (mixed with *C. extremiorientalis* on a sheet, OSA), 16 Oct. 1995, *S. Fujii* 4662 (mounted on the specimen of *Fimbristylis dipsacea*, OSA), 21 Nov. 2010, *S. Fujii* 14960 (KYO, MAK, OSA, SAP, TNS, TUS); Sindachi-cho, Sen-nan, 24 Oct. 1951, *K. Seto* 1967 (OSA, TNS). Hyogo Pref.: Tamaoka-cho, Kasai, 27 Sept. 1998, *M. Yanai* 29913 (mixed with *C. extremiorientalis*, *C. nipponicus* var. *spiralis* on a sheet, OSA). Nara Pref.: Jo-cho, Yamato-Koriyama, 10 Oct. 1995, *K. Seto* 45085 (mixed with *C. nipponicus* var. *spiralis* on a sheet, OSA); Ikaruga-cho, Ikoma-gun, 23 Sept. 2002, *K. Yamawaki s.n.*

(OSA). Okayama Pref.: Osaka, Kasaoka, 13 Oct. 1996, *S. Fujii* 5556 (OSA). Tokushima Pref.: Ikeda-cho, Oct. 12, 1947, *K. Abe s.n.* (TI).

*Notes 1.* Achenes of *Cyperus pacificus* var. *margoinflatus* readily float on water, but sink after air in the parenchymatous tissue in the inflated margins is removed by soaking in ethanol. The inflated margins appear to play a role in hydrochorous seed dispersal in the abovementioned habitats.

*Notes 2.* *Cyperus pacificus* var. *margoinflatus* is similar in appearance to *C. extremiorientalis*, *C. niigataensis*, *C. nipponicus* (including var. *spiralis*), but differs in the shape of the achenes and

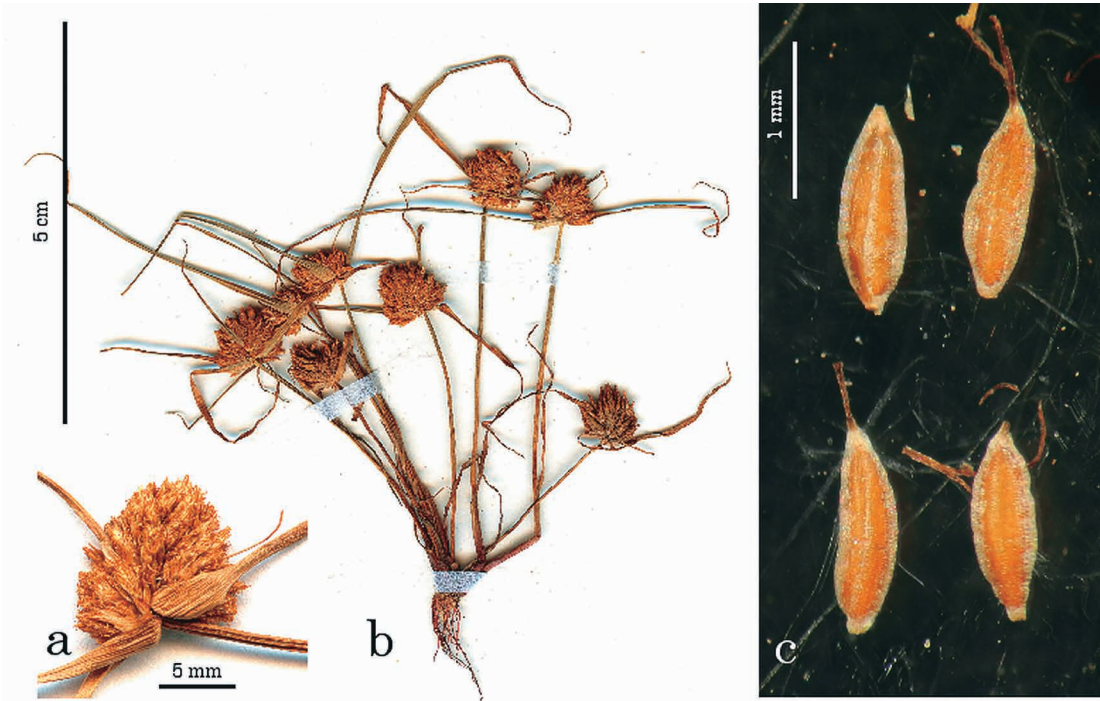


FIG. 2. *Cyperus pacificus* var. *margoinflatus* (S. Fujii 5587; holo-OSA), a: capitulum inflorescence, b: view of entire plant, c: oblong-ellipsoid achenes, trigonous types (left) and lenticular types (right). The two types show no difference otherwise.

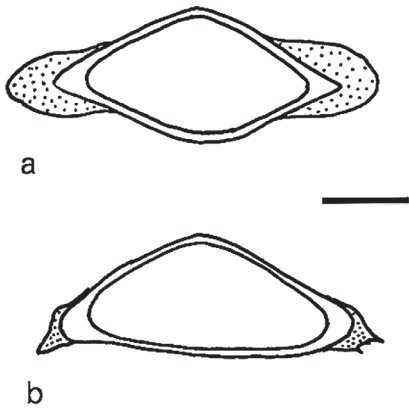


FIG. 3. Transverse section of mature achenes of *Cyperus pacificus* var. *margoinflatus* (a) and *Cyperus pacificus* var. *pacificus* (b). Scale bar: 0.2 mm. Dots indicate parenchyma tissue.

Key to *Cyperus pacificus* var. *margoinflatus* and allied taxa

1a. Achenes obovoid .....	2
1b. Achenes oblong or oblong-ellipsoid .....	4
2a. Scales orbicular-ovate, apex obtuse .....	<i>C. niigataensis</i>
2b. Scales ovate, apex acute .....	3
3a. Scales distichous .....	<i>C. nipponicus</i> var. <i>nipponicus</i>
3b. Scales spirally arranged .....	<i>C. nipponicus</i> var. <i>spiralis</i>
4a. Achenes oblong or oblong-ellipsoid, ca. 0.8 mm long, margins not winged .....	<i>C. extremiorientalis</i>
4b. Achenes oblong-ellipsoid, ca. 1 mm long, margins winged .....	5
5a. Margins of achene narrowly winged .....	<i>C. pacificus</i> var. <i>pacificus</i>
5b. Margins of achene distinctly inflated .....	<i>C. pacificus</i> var. <i>margoinflatus</i>

winged margins. These characters are summarized in the key to the new variety and allied taxa (see below). Yashiro (2007), Hoshino *et al.* (2011) and Katsuyama and Kitagawa (2014) provide good illustrations or photographs of these allied taxa, except *C. niigataensis*.

*Notes 3.* Some specimens of var. *margoinflatus* have been misidentified as *Cyperus niigataensis*; e.g. *Noguchi et al. s.n.* (KYO), *Noguchi & Huruhashi s.n.* (KYO), *K. Abe s.n.* (TI), *Sugino 2* (TNS) and *Seto 1967* (TNS). Photographs of *C. niigataensis* in Mutsuzawa-cho, Chiba Prefecture (Yashiro 2007) are certainly *C. pacificus* var. *margoinflatus*. *Cyperus niigataensis* has been collected only once in Niigata by U. Faurie in 1898 (Ohwi 1943, *U. Faurie 1823-holo* in KYO!), and its taxonomic status is ambiguous.

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